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LINTEL

Abstract

Lintels having metal side plates are described. In an exemplary embodiment, a lintel constructed in accordance with the present invention

5 includes a generally rectangular frame of a height, length and thickness substantially corresponding to the dimensions of the opening in which the lintel is to be installed. The frame is formed by connected, first and second elongate chord members (e.g., nominal "2xN" members) that extend in spaced, substantially parallel, overlying relationship to each other. The subject lintel also

10 includes at least one generally rectangular, metal side plate having at least first and second spaced groupings of integrally formed teeth extending from one side along opposite longitudinal edges thereof. The respective teeth groupings engage the first and second chords. The metal side plate member has a width intermediate of the height of the frame and the distance between the first and

15 second chords, and is positioned so as to overlap portions of each of the coplanar side surfaces of the first and second chords on one side of the frame, while leaving sufficient space between its lower longitudinal edge and the bottom edge of the frame to permit convenient fastener attachment of siding or other materials.

(S)

AUSTRALIA
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COMPLETE SPECIFICATION
STANDARD PATENT

Applicant(s):

MITEK HOLDINGS, INC.

Invention Title:

LINTEL

The following statement is a full description of this invention, including the best method of performing it known to me/us:

LINTEL

Field of the Invention

This invention relates generally to prefabricated, structural framing members used in a broad range of construction applications and, more 5 particularly, to a lintel having a metal side plate.

Background of the Invention

Lintels are typically used as structural framing members over windows and doors, as girders to support roof and floor trusses, and in other residential, 10 industrial, commercial and agricultural applications. Generally, lintels span the distance between two spaced supports and carry structural loads, e.g., the weight 15 of the structure above the lintel.

Known lintels are frequently fabricated on-site from two pieces of nominal "2xN" lumber, e.g., 2x10 or 2x12 lumber (hereinafter referred to as "chords"), and one or more pieces of filler material, e.g., 1/2" thick plywood, of selected 15 lengths for the particular application. The filler material is sandwiched between the chords, and then nails are driven through the chords and the filler material to form a composite structural member. The filler material is usually required so that the actual thickness of the composite lintel matches the width of the framing members which support the lintel.

20 These known composite lintels generally have far more capacity and utilize far more materials than necessary for most applications in which they are used. Furthermore, being solid, site-built members, such lintels are time-consuming to make, heavy to carry, and labor-intensive to install.

Another known type of lintel is made partly of wood and partly of steel, 25 and is marketed under the tradename Trifold. The known Trifold lintel includes a "J" shaped steel member having a center web portion, and integral flanges that extend in the same direction from opposing side edges of the web portion. To build a Trifold lintel, a wooden frame of desired size is constructed, and the steel

member web portion is nailed or screwed to, and completely covers, one side of the wooden frame. One integral flange of the steel member extends over the top surface of the wood frame, and the other flange extends over the bottom 5 surface of the frame. The Trifold lintel can then be installed, for example, over a window or door.

Although the Trifold lintel is lighter and utilizes less unnecessary material than the composite lintels discussed 10 above, like such composite lintels, the Trifold lintel is time-consuming and labor-intensive to assemble because of the large number of individually driven nails or screws that normally must be used to allow the Trifold lintel to carry common roof, floor or girder loads. Further, because 15 the web portion covers the entire side of the wooden frame upon which it is installed, it substantially impedes the application of siding and other materials to that side of the lintel.

20 It would be desirable to provide a lintel which does not have significant unnecessary capacity and, therefore, wastes less materials than known composite lintels. It would be desirable to provide a lintel which may be pre-fabricated in a factory for delivery to a job site to 25 eliminate the time, expense and imprecision associated with on-site assembly. It also would be desirable to provide a lintel which is relatively light weight to reduce shipping costs to the job site and to facilitate on-site handling, and to provide a lintel to which siding materials can be 30 readily nailed or screwed without predrilling.

Summary of the invention

The invention also provides a lintel, comprising:

35 a wood frame comprising first and second elongate chords extending substantially parallel to, and spaced from, each other, and a wood stiffening member extending



between said first and second elongate chords at each end of said lintel; and

5 a first substantially flat rectangular side plate comprising first and second spaced groupings of teeth projecting in one direction from said side plate, said first and second spaced groupings of teeth located along opposite longitudinal edges of said side plate, and at least some teeth of said first grouping engaged with said first chord, and at least some teeth of said second grouping engaged with said second chord, said side plate extending from a first end to a second end of said lintel.

More particularly, and in an exemplary embodiment, a lintel constructed in accordance with the present invention 15 includes a generally rectangular wood frame of a height, length and thickness substantially corresponding to the dimensions of the opening in which the lintel is to be installed. The frame is formed by connected first and second elongate chord members (e.g., nominal "2xN" members) 20 that extend in spaced, substantially parallel, overlying relationship to each other.

The invention also provides lintel side plate apparatus for a lintel, the lintel having a first and a second end, and 25 comprising first and second elongate chords extending substantially parallel to, and spaced from, each other, and at least one wooden stiffening member extending between the first and second elongate chords, said side plate apparatus comprising:

30 a substantially flat rectangular metal plate comprising first and second surfaces, said metal plate configured to extend from a first end to a second end of the lintel;

35 a first grouping of teeth extending from said first surface; and

a second grouping of teeth extending from said first surface, said second grouping of teeth spaced from



said first grouping of teeth, said first and second spaced groupings of teeth located along opposite longitudinal edges of said metal plate;

at least a portion of said first grouping of teeth configured to be embedded in the first elongate chord of the lintel and at least a portion of said second grouping of teeth configured to be embedded in the second elongate chord of the lintel.

10 Many alternative embodiments of the subject lintel are contemplated, and several are specifically disclosed. For example, in one alternate embodiment generally intended for applications where the subject lintel may be required to carry heavier loads, the frame is provided with one or more internal stiffening members that are connected to and extend transversely between the first and second elongate chords. With this embodiment, the metal side plate may also be fabricated to include a third grouping of integral teeth spaced intermediate of the first and second groupings of teeth for engagement with the stiffening members.

In yet another embodiment of the subject lintel, a plurality of metal side plates are provided at predetermined locations spaced lengthwise along at least one side of the lintel frame to provide openings through which electrical, plumbing or other members may be conveniently passed without the need for drilling or cutting the subject lintel. In addition, for applications where the subject lintel may be required to carry extreme loads, metal side plates may be installed on both inner and outer sides of the lintel frame.

The invention still further provides a method for fabricating a lintel having first and second elongate chords, a wood stiffening member located at each end of the lintel, and a first side plate comprising first and second spaced groupings of teeth, said method comprising the steps



of:

positioning the elongate chords substantially parallel to, and spaced from, each other;

5 chords so that the stiffening members extend between the first and second chord and a stiffening member is located at each end of the lintel; and

10 locating the first side plate over the elongate chords so that at least some teeth of the first grouping are over the first chord and at least some teeth of the second grouping are over the second chord, the first side plate extending from a first end to a second end of the lintel.

15 The invention still further provides a method for fabricating lintel side plate apparatus, said method comprising the steps of:

positioning a substantially rectangular portion of a sheet metal coil in a punch press;

20 punching first and second spaced groupings of teeth extending from one side of the portion of sheet metal; and

25 cutting the portion of sheet metal to a predetermined length of a lintel so that the lintel side plate apparatus is sized to extend from a first end to a second end of the lintel.

The subject lintel is a structural component capable of carrying substantial loads which minimizes unnecessary materials, production costs and waste. The lintel also 30 lends itself to being prefabricated under factory



conditions to reduce assembly costs, and may be made with a generally hollow inner core to reduce shipping costs. The hollow inner core also makes the lintel relatively light weight and easy to handle on-site. Optionally, the hollow 5 inner core may be filled, preferably with a light weight material, to provide enhanced thermal or sound insulation performance. In addition, and in each of the various 10 embodiments of the subject lintel described above, a portion of the lintel frame underlying the metal side plate is exposed, enabling convenient attachment of siding or 15 other materials to the lintel.

Brief Description of the Drawings

Figure 1 is a front view of a portion of a 15 building frame for a window including an exemplary embodiment of a lintel; constructed in accordance with the present invention;

Figure 2 is a perspective partially exploded view of the lintel shown in Figure 1;

20 Figure 3 is a schematic side view of the lintel shown in Figures 1 and 2;

Figure 4 is a perspective partially exploded view of an alternate embodiment of a lintel constructed in accordance with the present invention;

25 Figure 5 is a front view of yet another embodiment of a lintel constructed in accordance with the present invention and including two metal side plates installed at locations spaced lengthwise along one side of the lintel frame to provide an opening of the passage of 30 heating, electrical, plumbing or other materials.



Figure 6 is a rear view of the lintel shown in Figure 5.

Figure 7 is a schematic side view of a lintel constructed in accordance with still yet another embodiment of the present invention and having metal side plates installed on both sides of a lintel frame.

5 Detailed Description

Set forth below is a description of various embodiments of lintels constructed in accordance with the present invention. The term lintel, as used herein, refers to a structural framing member which spans the distance between two spaced supports and carries structural loads, e.g., the weight of the structure 10 above the lintel. Lintels typically are utilized over windows and doors, as girders to support roof and floor trusses, and in other residential, industrial, commercial and agricultural applications.

One exemplary lintel application is illustrated in Figure 1, wherein a lintel 10 constructed in accordance with the present invention spans the width of a window opening 12 formed by building framing members 16, 18, and 20. Lintel 10 is supported on framing members 16 and 18, and lintel 10 includes a wood frame 22 and a metal side plate 24. Lintel 10 supports the weight of the structure (not shown) above window opening 12. A portion 26 of wood frame 22 underlying metal side plate 24 is exposed, which enables convenient attachment 20 of siding or other materials to lintel 10.

Figure 2 is a perspective, partially exploded view of a portion of lintel 10 and more clearly illustrates generally rectangular wood frame 22 which has a height, length and thickness substantially corresponding to the opening in which lintel 10 is installed above the window opening 12 (not shown in Figure 2). 25 Frame 22 includes first and second elongate chords 28 and 30 which extend in spaced, substantially parallel, overlying relationship to each other. Chords 28 and 30 provide inner and outer side pairs of spaced substantially coplanar surfaces 32A, 32B, 33A and 33B that respectively extend to top and bottom side edges of frame 22. (Only top and bottom side edges 34 and 35 and coplanar surfaces 32A

and 33A on the inner side of the frame 22 are depicted in Figure 2.) Frame 22 also includes stiffening members 36 that are connected to and extend transversely between the first and second elongate chords 28 and 30. Stiffening members 36 are shown extending substantially vertically, or perpendicularly, to chords 28 and 5 30, although it is contemplated that the stiffening members 36 could extend diagonally, or angularly, relative to chords 28 and 30 without departing from the intended scope of the present invention. Chords 28 and 30 and stiffening members 36 may be nominal "2xN" lumber, e.g., 2x4 or 2x6 lumber, of selected lengths depending upon the specific application.

10 Lintel 10 also includes metal side plate 24 which has first and second spaced groupings 38 and 40 of teeth. Teeth groupings 38 and 40 extend from one side of the side plate 24 along opposite longitudinal edges thereof. The side plate 24 also includes a third grouping 42 of teeth spaced from and intermediate of the first and second teeth groupings 38 and 40. At least some teeth of the first 15 grouping 38 are engaged with the first chord 28, at least some teeth of the second grouping 40 are engaged with the second chord 30, and at least some teeth of third grouping 42 are engaged with the stiffening members 36.

17 Figure 3 is a schematic side view of lintel 10. As clearly shown in Figure 3, side plate 24 does not extend the full height of frame 22. Specifically, metal 20 side plate 24 has a width intermediate of the height of frame 22 and the distance between first and second chords 28 and 30, and is positioned so as to overlap portions of each of the coplanar side surfaces of first and second chords 28 and 30 on one side of frame 22, while leaving a sufficient space S1 (e.g., about one inch) between its lower longitudinal edge and the bottom edge of frame 22 to 25 permit convenient fastener attachment of siding or other materials.

27 The metal plate 24 is preferably formed of ASTM A653, Grade 33 or better galvanized sheet steel, and most preferably of such sheet steel with a thickness between 14 and 24 gauge. Such sheet steel material is available in coil form, in various widths, and the metal side plate 24 may be fabricated therefrom, 30 for example, by positioning a portion of the coil of the sheet metal material in a

conventional punch press and then simultaneously punching the spaced teeth groupings 38, 40, and 42 to extend from one side of the portion of sheet metal coil. The punched portion may then be cut off to the desired lintel length. The teeth in the teeth groups 38, 40 and 42 may be of conventional construction such

5 as the teeth of known metal connector plates used to form the joints of metal plate connected wood trusses, but most preferably are of the type employed with the MII 20 connector plate marketed by Mitek Industries, Inc. Side plate 24 can be provided to prefabricators of the subject lintel in a roll or pre-cut form in various lengths.

10 As also shown in Figure 3, connector plates 44 may be utilized on the side of frame 22 opposite side plate 24. Connector plates 44 typically are located at the interfaces between chords 28 and 30 and stiffening members 36, and such connector plates 44 provide secure engagement between stiffening members 36 and chords 28 and 30.

15 To fabricate lintel 10, chords 28 and 30 and stiffening members 36 are preferably positioned on an assembly table and jigged in the general outline of frame 22, with connector plates 44 positioned under the interfaces of the chords 28 and 30 and of the stiffening members 36 with their teeth pointed upwardly. Side plate 24 is then located over the other or top side of the chords 28 and 30

20 and stiffening members 36 so that at least a predetermined number of teeth of first grouping 38 are over first chord 28, of second grouping 40 are over second chord 30 and of third grouping 42 are over stiffening members 36, and so that lower longitudinal edge of the plate 24 is spaced from the lower edge 35 of the frame 22 a distance sufficient to allow convenient nail or screw attachment of siding materials to the chord 30. This spacing is preferably about 1 inch. Side plate 24 and the connector plates 44 are then engaged with chords 28 and 30 and stiffening members 36 by a press or a roller in a manner known in the art.

25 Alternatively, the assembly may be assembled one side at a time and then flipped over for completion of the assembly process.

Lintel 10 provides the advantages of reducing waste and costs. For example, lintel 10 has some excess weight bearing capacity, but lintel 10 does not have excess capacity to the same extent of known composite lintels. Further, side plate 24 reduces the amount of material required to fabricate lintel 10 and 5 therefore reduces the overall cost of lintel 10. In addition, lintel 10 is light weight as compared to known composite lintels made of wood.

Lintel 10 also can be readily pre-fabricated at a factory and delivered to a job site completely assembled. Therefore, a skilled carpenter would not be required to make a lintel on-site, which enhances worker productivity. 10 Additionally, the above described metal side plate lintel 10 leaves sufficient space between the side plate lower longitudinal edge and the bottom edge of the frame to permit fastener attachment of siding or other materials to lintel 10 without predrilling the side plate or splitting the lower chord 30 of the frame 22.

Figure 4 is a perspective view of an alternative embodiment of a lintel 50 15 constructed in accordance with the present invention. As compared to lintel 10, lintel 50 typically would be utilized in lighter load applications. Components of lintel 50 which are identical to components of lintel 10 are referenced in Figure 4 using the same reference numerals used in connection with lintel 10. As compared to lintel 10, lintel 50 includes stiffening members 36 only at opposing 20 ends of frame 22 and the intermediate stiffening members are eliminated. In addition, and with the elimination of the intermediate stiffening members, third grouping 42 of teeth in side plate 24 is eliminated. The side plate 24 also is illustrated with optional stiffening ribs 52 which provide extra rigidity for plate 24.

25 Figures 5 and 6 are views of opposing sides of another embodiment of a lintel 100 constructed in accordance with the present invention. Components of lintel 100 which are identical to components of lintel 10 are referenced in Figures 5 and 6 using the same reference numerals used in connection with lintel 10. Lintel 100 includes wood frame 22 and rather than a single metal side plate, a 30 plurality of metal side plates 102 and 104 are positioned at predetermined

locations spaced lengthwise along at least one side of frame 22 to provide an opening 106 through which electrical, plumbing or other members may be conveniently passed without the need for drilling or cutting lintel. Side plates 102 and 104 include first, second, and third groups 108, 110 and 112 of teeth to 5 engage chords 28 and 30 and stiffening members 36.

Figure 7 is a schematic side view of a lintel 150 constructed in accordance with yet another embodiment of the present invention and having metal side plates 24 installed on both sides of lintel frame 22. Components of lintel 150 which are identical to components of lintel 10 are referenced in Figure 7 using 10 the same reference numerals used in connection with lintel 10. Use of side plates 24 on both sides of frame 22 may be required in applications where lintel 150 is to carry extreme loads. In addition, light weight material can be located in the spaces (not shown in Figure 7) between stiffening members 36 before engaging the second plate 24 to frame 22 so that such material is trapped within lintel 150. 15 Such use of material provides enhanced thermal or sound insulation performance for lintel 150.

The various lintel embodiments described above are structural components capable of carrying substantial loads which minimize unnecessary materials, production costs and waste. Such lintels lend themselves to being prefabricated 20 under factory conditions to reduce assembly costs. The lintels also are relatively light weight and easy to handle on-site. In addition, and in each of the various embodiments of the subject lintel described above, a portion of the lintel frame underlying the metal side plate is exposed, enabling convenient attachment of siding or other materials to the lintel.

25 From the preceding description of various embodiments of the present invention, it is evident that the objects of the invention are attained. Although the invention has been described and illustrated in detail, it is to be clearly understood that the same is intended by way of illustration and example only and is not to be taken by way of limitation. Accordingly, the spirit and scope of the invention are to be limited only by the terms of the appended claims.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A lintel, comprising:

5 chords extending substantially parallel to, and spaced from, each other, and a wood stiffening member extending between said first and second elongate chords at each end of said lintel; and

10 a first substantially flat rectangular side plate comprising first and second spaced groupings of teeth projecting in one direction from said side plate, said first and second spaced groupings of teeth located along opposite longitudinal edges of said side plate, and at least some teeth of said first grouping engaged with said 15 first chord, and at least some teeth of said second grouping engaged with said second chord, said side plate extending from a first end to a second end of said lintel.

2. A lintel in accordance with Claim 1 wherein said

20 first side plate is positioned spaced from one edge of said frame.

3. A lintel in accordance with Claim 1 further

25 comprising at least one stiffening member extending between and secured to said first and second elongate chords and located between the ends of said lintel.

4. A lintel in accordance with Claim 3 further

30 comprising a plurality of connector plates for securing said stiffening members to said first and second chords.

5. A lintel in accordance with Claim 3 wherein said

first side plate further comprises a third grouping of teeth spaced from and intermediate said first and second 35 groupings of teeth, at least some teeth of said third grouping of teeth engaged with said stiffening members.



6. A lintel in accordance with Claim 5 further comprising a plurality of connector plates for securing said stiffening members to said first and second chords.

5 7. A lintel in accordance with Claim 1 wherein said first side plate further comprises a plurality of stiffening ribs.

8. A lintel in accordance with Claim 1 further
10 comprising a second side plate comprising first and second groupings of teeth, said second side plate engaged with said first and second chords on a side of said chords opposite said first side plate.

15 9. A lintel in accordance with Claim 8 wherein said second side plate comprises first and second groupings of teeth, at least some teeth of said first grouping of teeth of said second side plate engaged to said first chord, and at least some of said second grouping of teeth of said 20 second side plate engaged to said second chord.

10. A lintel in accordance with Claim 9 wherein said second side plate further comprises a third grouping of teeth intermediate said first and second groupings of 25 teeth.

11. A lintel in accordance with Claim 10 further comprising a plurality of stiffening members extending between and secured to said first and second elongate chords, at least some teeth of said third grouping of teeth of said second side plate engaged to respective stiffening members.

12. Lintel side plate apparatus for a lintel, the
35 lintel having a first and a second end, and comprising first and second elongate chords extending substantially parallel to, and spaced from, each other, and at least one



wooden stiffening member extending between the first and second elongate chords, said side plate apparatus comprising:

5 a substantially flat rectangular metal plate comprising first and second surfaces, said metal plate configured to extend from a first end to a second end of the lintel;

10 a first grouping of teeth extending from said first surface; and

15 a second grouping of teeth extending from said first surface, said second grouping of teeth spaced from said first grouping of teeth, said first and second spaced groupings of teeth located along opposite longitudinal edges of said metal plate;

20 at least a portion of said first grouping of teeth configured to be embedded in the first elongate chord of the lintel and at least a portion of said second grouping of teeth configured to be embedded in the second elongate chord of the lintel.

25 13. Side plate apparatus in accordance with Claim 12 further comprising a third grouping of teeth extending from said metal plate first surface, said third grouping of teeth intermediate said first and second grouping of teeth.

30 14. Side plate apparatus in accordance with Claim 12 wherein said metal plate is fabricated from galvanized sheet steel having a thickness within a range of 14 to 24 gauge.

35 15. Side plate apparatus in accordance with Claim 12 wherein said teeth have a MII 20 type configuration.

16. Side plate apparatus in accordance with Claim 12
35 further comprising at least one stiffening rib integral with said metal plate.



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17. A method for fabricating a lintel having first and second elongate chords, a wood stiffening member located at each end of the lintel, and a first side plate comprising first and second spaced groupings of teeth, said 5 method comprising the steps of:

positioning the elongate chords substantially parallel to, and spaced from, each other;

10 positioning the stiffening members between the chords so that the stiffening members extend between the first and second chord and a stiffening member is located at each end of the lintel; and

15 locating the first side plate over the elongate chords so that at least some teeth of the first grouping are over the first chord and at least some teeth of the second grouping are over the second chord, the first side plate extending from a first end to a second end of the lintel.

18. A method in accordance with Claim 17 wherein 20 locating the first side plate over the elongate chords comprises the step of locating the first side plate so that it is spaced from one edge of the frame.

19. A method in accordance with Claim 17 further 25 comprising the step of pressing the first side plate into engagement with the first and second chords.

20. A method in accordance with Claim 17 further comprising the step of rolling the first side plate into 30 engagement with the first and second chords.

21. A method in accordance with Claim 17 further comprising the steps of;

35 locating connector plates over the interfaces between the stiffening members and the first and second chords; and

engaging the connector plates with the stiffening



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member and the chords.

22. A method in accordance with Claim 21 wherein the first side plate further includes a third grouping of teeth intermediate the first and second groupings of teeth, and said method further comprises the step of engaging at least some teeth of the third grouping of teeth with the stiffening members.

10 23. A method in accordance with Claim 17 wherein the lintel further includes a second side plate comprising first and second groupings of teeth, said method further comprising the steps of:

15 locating the second side plate over the elongate chords so that at least some teeth of the first grouping of teeth of the second side plate engage the first chord and at least some teeth of the second grouping of teeth of the second side plate engage the second chord.

20 24. A method in accordance with Claim 23 further comprising the step of pressing the second side plate into engagement with the first and second chords.

25 25. A method in accordance with Claim 23 further comprising the step of rolling the second side plate into engagement with the first and second chords.

30 26. A method in accordance with Claim 23 wherein the lintel further includes at least one stiffening member extending between the first and second chords and located between the ends of the lintel and wherein the second side plate further includes a third grouping of teeth intermediate the first and second groupings of teeth, and said method further comprises the step of engaging at least some teeth of the third grouping of teeth of the second plate to each of the at least one stiffening member.



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27. A method for fabricating lintel side plate apparatus, said method comprising the steps of:

positioning a substantially rectangular portion of a sheet metal coil in a punch press;

5 punching first and second spaced groupings of teeth extending from one side of the portion of sheet metal; and

10 cutting the portion of sheet metal to a predetermined length of a lintel so that the lintel side plate apparatus is sized to extend from a first end to a second end of the lintel.

28. A method in accordance with Claim 27 further comprising the step of punching a third grouping of teeth in the portion of sheet metal coil, the third grouping of teeth being spaced and intermediate the first and second groupings of teeth.

Dated this 16th day of November 2000.

20 MITEK HOLDINGS, INC.

By their Patent Attorneys

GRIFFITH HACK

Fellows Institute of Patent and
Trade Mark Attorneys of Australia



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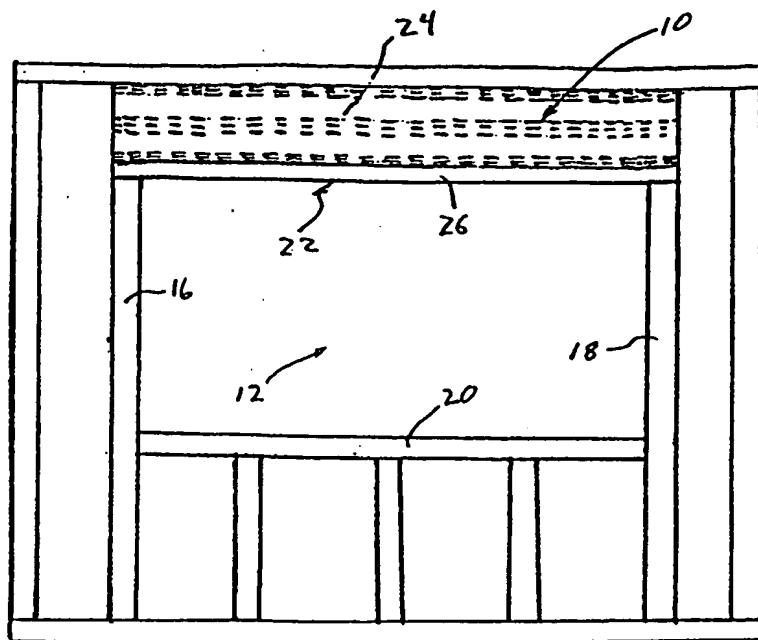


FIG. 1

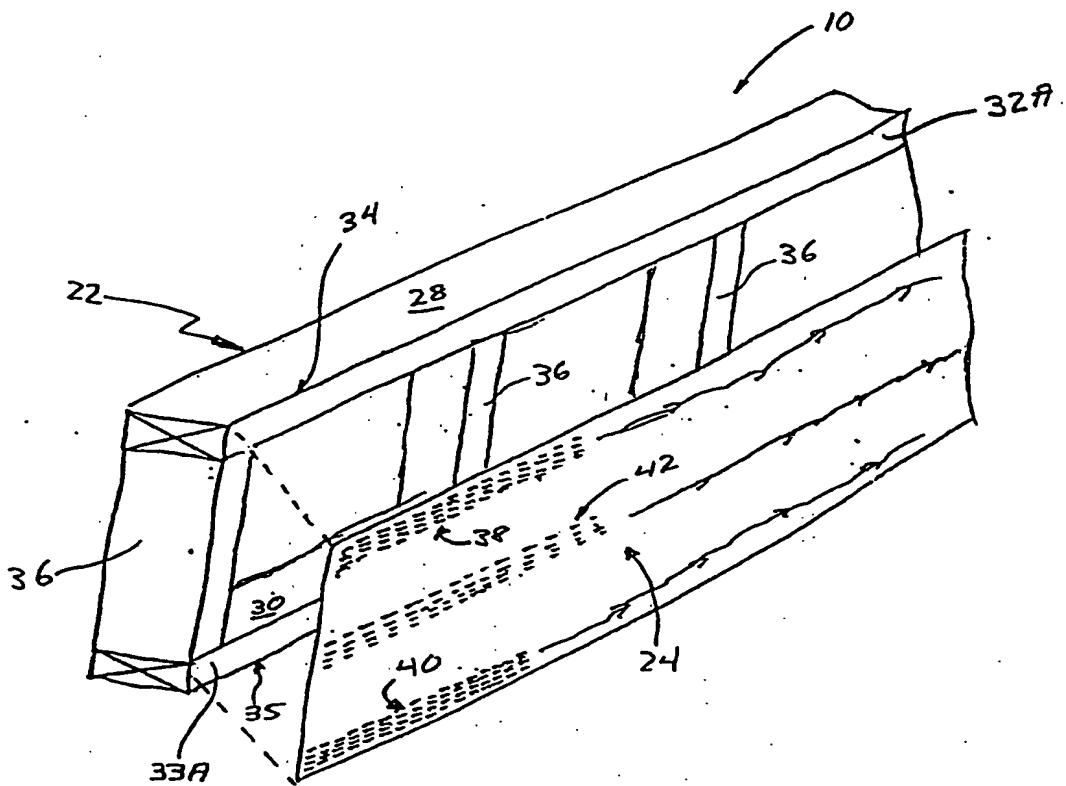


FIG. 2

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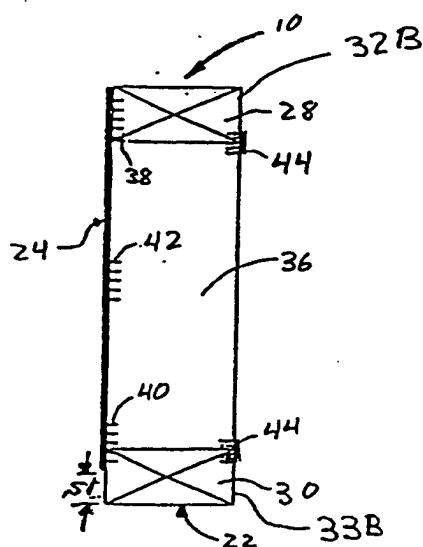


FIG. 3

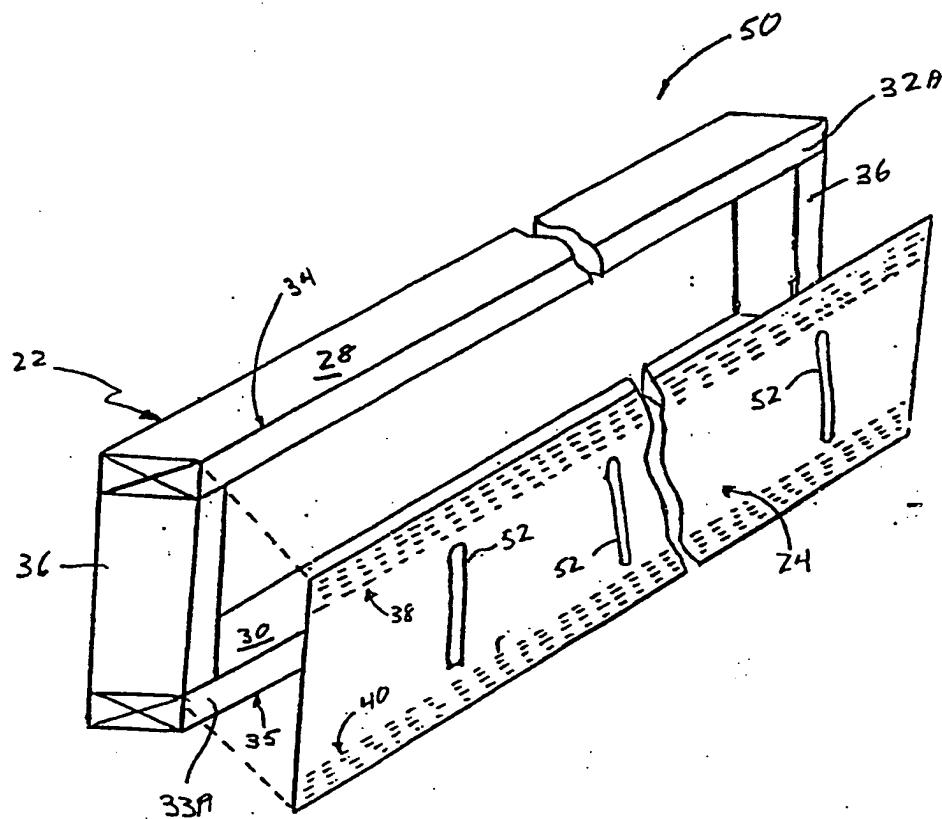


FIG. 4

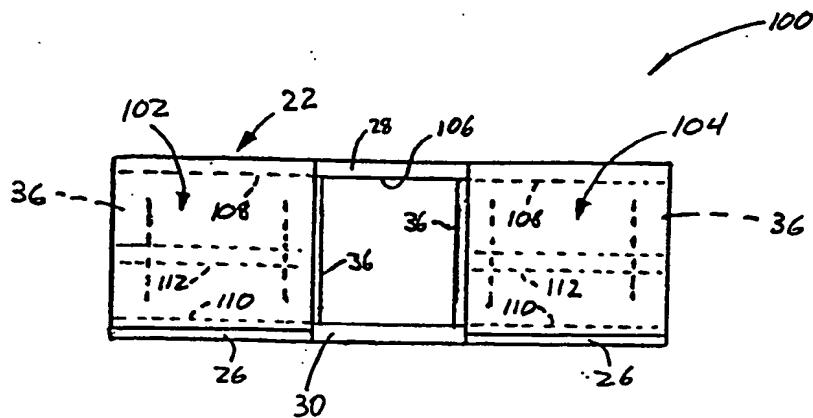


FIG. 5

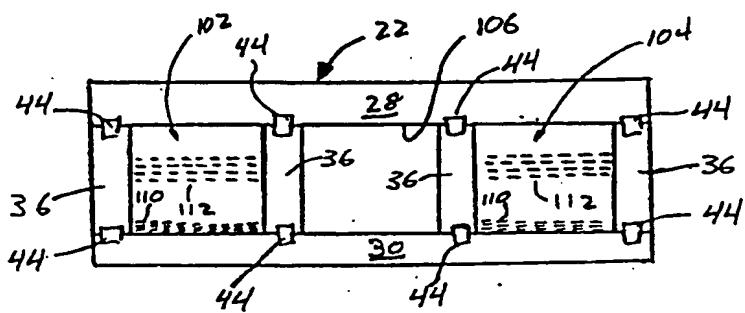


FIG. 6

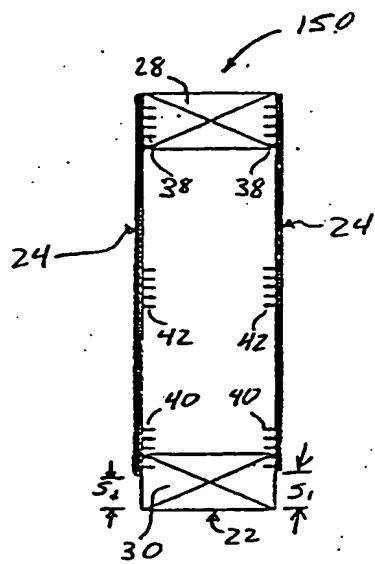


FIG. 7

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